

## CLASSROOM ACTIVITY

### Comparison of Snow Cover on Different Continents Monthly Snow and Ice Amount, December 1998

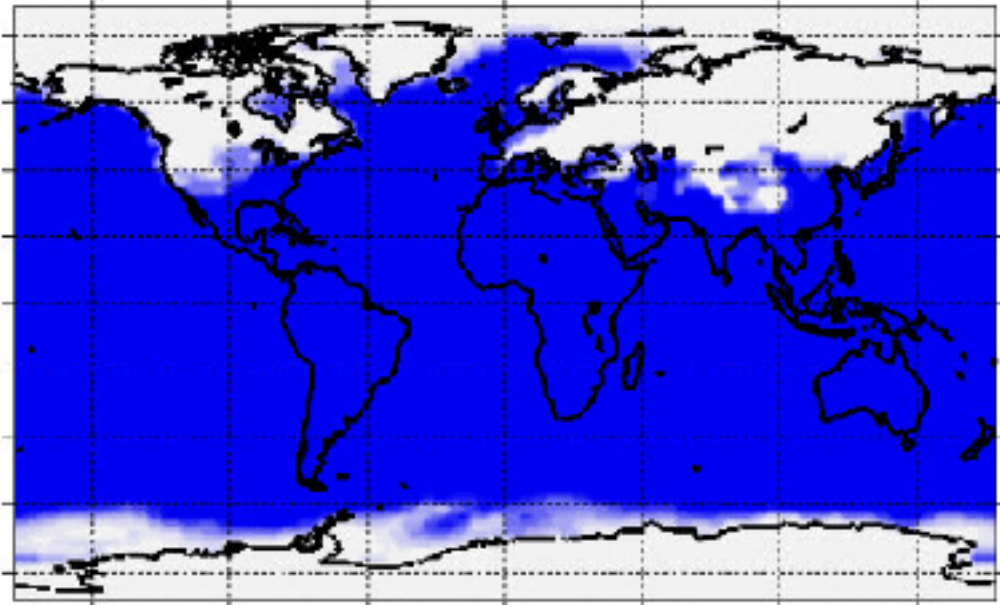


Image courtesy MY NASA DATA Live Access Server. Monthly Snow and Ice Amount December 1998

**Purpose:** Students will use the Live Access Server (LAS) to form maps and a numerical text file of snow cover for each continent on a particular date. They will analyze the data for each map and corresponding text file to determine an estimate of snow cover for each continent.

**Grade Level:** 4-8

**Estimated Time for Completing Activity:** One 50 minute class period

**Learning Outcomes:**

- \* Gain knowledge in using the Live Access Server
- \* Compare measurements from maps and raw data
- \* Practice estimating percentages

**National Standards:**

- \* Geography: Places and Regions
- \* Math: Number and Operations
- \* Math: Data Analysis and Probability
- \* Science Content: D Earth and Space Science

**Massachusetts Frameworks**

\* **Guiding Principal V:** Investigation, experimentation, and problem solving are central to science and technology/engineering education.

\* ES.3-5 (6): Explain how air, temperature, moisture, wind speed and direction, and precipitation make up the weather in a particular place and time.

\* ES.3-5 (7): Distinguish among the various forms of precipitation (rain, snow, sleet, and hail), making connections to the weather in a particular place and time.

\* ES.3-5 (8): Describe how global patterns such as the jet stream and water currents influence local weather in measurable terms such as temperature, wind direction and speed, and precipitation.

\* ES.6-8 **(1)**: Recognize, interpret, and be able to create models of the earth' common physical features in various mapping interpretations, including contour maps..

\* PS.3-5 **(3)**: Describe how water can be changed from one state to another by adding or taking away heat.

**Prerequisite**

- \* Geographical familiarity with the different continents
- \* Prior experience with estimating percentages
- \* Familiarity with using latitude and longitude and an atlas to locate geographical areas

**Tools needed**

- \* Computer with access to the Internet
- \* Atlas

**Vocabulary:**

- \* ISCCP
- \* land mask
- \* latitude
- \* longitude
- \* percentage

**Lesson Links:**

- \* Live Access Server Intermediate Edition
- \* Snowmap
- \* Excel file for Extension Activity

**Background:**

The Earth is covered by many different things. For example, a majority of the Earth is covered by water. Some regions of the world are covered in ice. Plants, animals and people that reside in these regions must make special adaptations to their environment. In some of these regions the ice is so thick that it is permanently frozen, while in others the ice grows and retreats in correspondence with seasons.

The data used in this lesson comes from the International Satellite Cloud Climatology Project (ISCCP). ISCCP computes fractional snow and ice coverage by scanning the earth using visible, infrared and microwave imagery.

**Procedure:**

Overview:

Students will create maps of the snow cover of each continent for a particular date. They will then compare their image with the text file for that map. From that information they will estimate the percentage of snow cover for each continent. They will then present their information in the form of a letter, a power point presentation, or a brochure.

**Instructions:**

1. Students will be read a letter from Mr. Claus (or similar motivator).

**Letter:**

Dear Students,

Last year after the holidays I came down with a terrible cold. Mrs. Claus was very upset with me, suggesting I retire. I said I would retire only if more than 75 percent of any continent on the planet (excluding Antarctica) was covered in snow on my big day. Can you write me a report to convince Mrs. Claus that I do not need to retire?

Sincerely,

Mr. Claus

2. Students will be instructed on how to use the Live Access Server to produce maps

and to view the accompanying text files.

**Directions:**

**Start:** at the [MY NASA DATA](http://mydas.nasa.gov/) <<http://mydas.nasa.gov/>> home page

**Click:** on Data Access

**Click:** on Live Access Server (Intermediate Edition) (LAS)

**Select:** Dataset Land

**Dataset:** Variable: Monthly Snow Ice Amount (ISCCP)

**Click:** on Next

**Select view:** Longitude Latitude Map

**Select output:** Color Plot

**Select region:** North America

**Date:** 15 December 1998

**Click:** on Next

**Select below the map:** Open a permanent link to this plot in a new window

**Return:** to LAS

**Change select output:** Table of Values (text)

**Click:** on Next

3. Compare the text information to the map. Analyze both to determine the percent of land you would estimate to have snow cover.

4. Record the percentage from the map and the text analysis beside each continent below. Repeat steps 1 through 4 for the other continents:

N. America

Europe

Australia

Asia

Africa

S. America

Antarctica (S. Pacific)

Questions:

1. What can you conclude about the snow cover on each continent?

2. What relationships do you see between the maps you have created and the text data?

3. What are some things that could affect the snow cover amounts from year to year?

**Extensions:**

1. Students may pick out a specific latitude and longitude for a location in the world and create charts or maps for that location.

2. Students may explore other ways of representing the snow cover data using the Live Access Server. For example, one area over a certain span of time.

3. Students may create maps for other months in order to see the difference in snow cover.

4. For students learning Excel or other spreadsheet technology, an Excel file is available in the Lesson Links which contains both snow cover and land mask data. With the land information included, students may calculate the actual percentage of snow cover over a continent of interest.

Lesson plan is from My NASA Data.

The original Lesson plan was contributed by DeAnn Scearce, Mount Vernon, IA

This plan has been updated for use in MA by Howard Dimmick of MME.